

Upon entry of the above noted amendments, claims 1-9,13,15, 20 and 22-29 will be pending (claims 16,17 and 21 having been canceled and new independent claim 27 and its dependents 28 and 29 having been added). Claims 1-7 and 22-29 are directed at the elected method of the present invention while claims 8, 9, 13, 15, and 20 are directed at an apparatus of the present invention. On the belief that the apparatus claims are allowable together with the below discussed method claims, re-insertion and allowance of the apparatus claims is respectfully requested.

The rejection under 35 U.S.C. 112, first paragraph, is submitted to be non-applicable in view of the cancellation of claim 21. As to claim 22 (and new claim 29), it is respectfully submitted that these claims are in full conformance with 35 U.S.C. 112, first paragraph. In this regard, reference is made to the original application and the illustration of heating systems 7 shown in the figure for each of the firing space, stabilizing section and feeder, and the corresponding disclosure, for example, on page 5 of the present application.

Accompanying this filing is also a Proposed Drawing Amendment with red highlighting showing proposed changes. The submitted revised drawing features a stabilizing space height which is shown in conformance with the .4 to .6 parameter set out in, for example, claims 2, 25, 26 and 28. No new matter is presented as full support is found in the original application such as original claim 9 and the disclosure on page 4 (two occurrences mid and bottom of page) and the disclosure on page 5, lines 4 and 5. As the original application explicitly supports the depiction presented in the proposed drawing revisions, no new matter has been introduced in the proposed drawing amendment.

In the Office Action independent claim 1-7, 21 and 25-26 were rejected by the Examiner under 35 U.S.C. 103(a) based on the three (four) way combination of Austin in view of Shofner

and Naber (and optionally in view of Sorg). In the rejection, reliance was placed on Shofner (illustrated in a marked up sheet accompanying the Office Action). In the rejection, certain areas of the Shofner furnace interior as disclosing a system for melting the material in Austin (the latter noted as lacking any specifics as to how its disclosed material is provided) were presented as representing the claimed difference between the furnace firing section and stabilizing section of the present invention with the notation that "space and section need not have any physical boundaries". In the present claim 1 (and new claim 27) the relationship between the furnace firing section and the furnace stabilizing section is defined structurally with respect to first floor and roof surfaces of the firing space and second floor and roof surfaces pertaining to the stabilizing section, with the relationship between these respective surfaces being featured in the claims. Accordingly, none of the references relied upon in the rejection of the claims disclose or suggest the furnace (firing space and stabilizing section), feed port and feeder section relationship of the claimed invention which promotes the beneficial glass melt composition outlined in the discussion of the present application.

No new matter is introduced with these claim amendments as the presently claimed firing space and stabilizing section constitution and relationship is explicitly and inherently disclosed/illustrated in the original application (e.g., the disclosure concerning a higher height firing space and the more specific stabilization/firing space range of .4 to .6 discussed above).

Reference is also made to the claims directed at having heating systems such as systems 7 shown in the figure available in each of the firing section and stabilizing section of the furnace as well as the feeder section downstream. This heating system arrangement has particular advantages in combination with the different sections described above.

AMENDMENT
U.S. Appln. No. 09/314,001

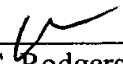
No fees are believed due in connection with this filing. However, if any fees are deemed necessary, the Examiner is hereby authorized to charge any such fees to Deposit Account No. 02-4300.

Applicants look forward to receipt of confirmation of allowance of the present application in due course. If for any reason, the present application is not deemed in immediate condition for allowance (e.g. a remaining informality), the Examiner is invited to telephone the undersigned for additional discussion.

Respectfully submitted,

SMITH, GAMBRELL & RUSSELL, L.L.P.

By



Dennis C. Rodgers, Reg. No. 32,936
1850 M Street, N.W., Suite 800
Washington, D.C. 20036
Telephone: (202) 659-2811
Facsimile: (202) 263-4329

Date: March 26, 2002

MARKED UP VERSION OF CLAIM CHANGES

IN THE CLAIMS:

1. (Twice Amended) A method for producing basalt fibers, comprising the steps of:

preheating basalt;

introducing the preheated basalt into a melting furnace;

heating the basalt in a firing space [within] **defined in part by first interior floor and roof surfaces of** said furnace to form a glass mass;

providing the glass mass to a stabilizing section of the melting furnace, which stabilizing section is **defined in part by second interior floor and roof surfaces of said furnace with said second interior floor and roof surfaces having** [of a] lesser height **spacing** than **that of said first interior floor and roof surfaces of** the firing space and **said stabilizing section** has an interior that opens out to the firing space, until the glass mass reaches a fiber manufacturing temperature, and then, introducing the glass mass from the stabilizing section into a feeder by passing the glass mass through a feed port extending between an interior surface of said stabilizing section and the feeder and retaining the glass mass in the feeder to obtain a glass mass having the composition

$$\frac{\text{Al}_2\text{O}_3 + \text{SiO}_2}{\text{CaO} + \text{MgO}} \geq 3$$

$$\frac{\text{FeO}}{\text{Fe}_2\text{O}_3} \geq 0.5$$

$$\frac{2\text{Al}_2\text{O}_3 + \text{SiO}_2}{2\text{Fe}_2\text{O}_3 + \text{FeO} + \text{CaO} + \text{MgO} + \text{K}_2\text{O} + \text{Na}_2\text{O}} > 0.5; \text{ and}$$

AMENDMENT

U.S. Appln. No. 09/314,001

forming fibers by pulling the glass mass from spinnerets which receive glass from the feeder.

8. (Twice Amended) Apparatus for producing basaltic fibers, comprising

a basalt receiver;

a melting furnace having a firing space defined in part by first interior floor and roof surfaces of said furnace and a stabilizing section defined in part by second interior floor and roof surfaces of said furnace with said second interior floor and roof surfaces having [of a] lesser height spacing than that of said first interior floor and roof surfaces of the firing space with the stabilizing section [being of lesser height than the firing space and the stabilizing section] opening out to the firing space;

a heat [exchange] exchanger connecting the basalt receiver to the firing space for preheating basalt which is charged into the melting furnace;

a feeder which receives molten glass from the melting furnace, said feeder being connected by the stabilizing section to the firing space by way of a port opening extending from an interior surface of said stabilizing section to said feeder;

spinnerets which receive molten glass from the feeder; and

mechanisms which pull fibers from the spinnerets.

22. (Amended) A method according to claim [21]1 further comprising heating the glass mass while in each of said firing space, stabilizing section and feeder, and wherein [heating is carried out with heaters provided in] each of said firing space, stabilizing section and feeder have a heating system.

AMENDMENT

U.S. Appln. No. 09/314,001

25. (Amended) A method according to claim [21] **22** wherein providing the glass mass to the stabilizing section includes feeding the glass mass to a stabilizing section having an interior height between the second floor and roof surfaces that is .4 to .6 times the firing space height between the first floor and roof surfaces.

26. (Amended) A method according to claim 1 wherein providing the glass mass to the stabilizing section includes feeding the glass mass to a stabilizing section having an interior height between the second floor and roof surfaces that is .4 to .6 times the firing space height between the first floor and roof surfaces.

CLEAN VERSION OF CLAIM CHANGES

IN THE CLAIMS:

1. (Twice Amended) A method for producing basalt fibers, comprising the steps of:
preheating basalt;
introducing the preheated basalt into a melting furnace;
heating the basalt in a firing space defined in part by first interior floor and roof surfaces
of said furnace to form a glass mass;
providing the glass mass to a stabilizing section of the melting furnace, which stabilizing
section is defined in part by second interior floor and roof surfaces of said furnace with said
second interior floor and roof surfaces having lesser height spacing than that of said first interior
floor and roof surfaces of the firing space and said stabilizing section has an interior that opens
out to the firing space, until the glass mass reaches a fiber manufacturing temperature, and then,
introducing the glass mass from the stabilizing section into a feeder by passing the glass mass
through a feed port extending between an interior surface of said stabilizing section and the
feeder and retaining the glass mass in the feeder to obtain a glass mass having the composition

$$\frac{\text{Al}_2\text{O}_3 + \text{SiO}_2}{\text{CaO} + \text{MgO}} \geq 3$$

$$\frac{\text{FeO}}{\text{Fe}_2\text{O}_3} \geq 0.5$$

$$\frac{2\text{Al}_2\text{O}_3 + \text{SiO}_2}{2\text{Fe}_2\text{O}_3 + \text{FeO} + \text{CaO} + \text{MgO} + \text{K}_2\text{O} + \text{Na}_2\text{O}} > 0.5; \text{ and}$$

forming fibers by pulling the glass mass from spinnerets which receive glass from the
feeder.

8. (Twice Amended) Apparatus for producing basaltic fibers, comprising
a basalt receiver;

E²
a melting furnace having a firing space defined in part by first interior floor and roof surfaces of said furnace and a stabilizing section defined in part by second interior floor and roof surfaces of said furnace with said second interior floor and roof surfaces having lesser height spacing than that of said first interior floor and roof surfaces of the firing space with the stabilizing section opening out to the firing space;

a heat exchanger connecting the basalt receiver to the firing space for preheating basalt which is charged into the melting furnace;

a feeder which receives molten glass from the melting furnace, said feeder being connected by the stabilizing section to the firing space by way of a port opening extending from an interior surface of said stabilizing section to said feeder;

spinnerts which receive molten glass from the feeder; and

mechanisms which pull fibers from the spinnerets.

E³
22. (Amended) A method according to claim 1 further comprising heating the glass mass while in each of said firing space, stabilizing section and feeder, and wherein each of said firing space, stabilizing section and feeder have a heating system.

E⁴
25. (Amended) A method according to claim 22 wherein providing the glass mass to the stabilizing section includes feeding the glass mass to a stabilizing section having an interior height between the second floor and roof surfaces that is .4 to .6 times the firing space height between the first floor and roof surfaces.

26. (Amended) A method according to claim 1 wherein providing the glass mass to the stabilizing section includes feeding the glass mass to a stabilizing section having an interior

E4 height between the second floor and roof surfaces that is .4 to .6 times the firing space height between the first floor and roof surfaces.

27. (New) A method for producing basalt fibers, comprising the steps of:

preheating basalt;

introducing the preheated basalt into a melting furnace;

heating the basalt in a firing space defined in part by first interior floor and roof surfaces of said furnace to form a glass mass;

E5 providing the glass mass to a stabilizing section of the melting furnace, which stabilizing section is defined in part by second interior floor and roof surfaces of said furnace with said second interior floor and roof surfaces having lesser height spacing than that of said first interior floor and roof surfaces of the firing space and said stabilizing section has an interior that opens out to the firing space, until the glass mass reaches a stabilizing section temperature, and then, introducing the glass mass from the stabilizing section into a feeder by passing the glass mass through a feed port extending between an interior surface of said stabilizing section and the feeder and retaining the glass mass in the feeder, and then forming fibers from glass mass derived from said feeder.

3bF2 28. (New) A method according to claim 27 wherein providing the glass mass to the stabilizing section includes feeding the glass mass to a stabilizing section having an interior height between the second floor and roof surfaces that is .4 to .6 times the firing space height between the first floor and roof surfaces.

AMENDMENT

U.S. Appln. No. 09/314,001

29. (New) A method according to claim 27 further comprising heating the glass mass while
in each of said firing space, stabilizing section and feeder, and wherein each of said firing space,
stabilizing section and feeder have an individual heating system (7).
